IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of		Before the Board of Appeals	
Håkan LÖVSÉN		Appeal No.:	
Appl. No.:	09/700,926	Group:	3662
Filed:	November 21, 2000	Examiner:	ALSOMIRI
Conf.:	3060		

For: DEVICE FOR POSTION DETERMINATION BY MEANS OF RADIO WAVES

APPEAL BRIEF TRANSMITTAL FORM

MS APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

March 1, 2005

Sir:

Transmitted herewith is an Appeal Brief on behalf of the Appellants in connection with the above-identified application.

☐ The enclosed document is being transmitted via the Certificate of Mailing provisions of 37 C.F.R. § 1.8.

A Notice of Appeal was filed on December 1, 2004.

☐ Applicant claims small entity status in accordance with 37 C.F.R. § 1.27

The fee has been calculated as shown below:

☒ Extension of time fee pursuant to 37 C.F.R. §§ 1.17 and 1.136(a) - $120.00.

☒ Fee for filing an Appeal Brief - $500.00 (large entity).

☒ Check(s) in the amount of $620.00 is(are) attached.

☐ Please charge Deposit Account No. 02-2448 in the amount of $0.00. A triplicate copy of this sheet is attached.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

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TCB/RJM/kmr
1807-0151P

Attachment(s)

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PATENT
1807-0151P

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BRIEF ON BEHALF OF APPELLANT

MS APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Date: March 1, 2005

Sir:

This is an Appeal from the Rejection of Claims 1, 2 and 4-8 in the above-identified application, which claims were finally rejected in the Office Action dated June 4, 2004.

I. REAL PARTY IN INTEREST

Combitech Traffic Systems AB is the Assignee of the present application and the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

None

III. STATUS OF THE CLAIMS

Claims 1, 2 and 4-8 have been finally rejected by the Examiner in connection with the above-identified application. Claim 3 has been cancelled. Claims 1, 2 and 4-8 are set forth in the attached Appendix.

IV. STATUS OF AMENDMENTS

The Amendment after Final Rejection that was filed on September 1, 2004 has been entered.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The claimed subject matter relates to a device for determining the position of a vehicle on a relatively narrow roadway. Radio waves are emitted from the device and reflected by the vehicle. At least two array antennas (1, 2) arranged across the roadway to receive the reflected radio ways. The array antenna (1) includes antenna elements (5-9), and the array antenna (2) includes antenna elements (10-14). One of the antenna elements in the respective array antenna constitutes the phase center (5, 10) of each array antennas. The antenna elements (5-14) of the array antennas are connected to one another such that the distance (d) between the phase centers (5, 10) of the array antennas (1, 2) included is smaller than half the width of an individual array antenna (1, 2). Although the phase center (5, 10) are placed close to each other, there is at least a distance (d) separating the phase centers, and the distance d is not equal to zero.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 2 and 6-8 have been finally rejected under 35 U.S.C. §102(a) as being anticipated by U.S. Patent No. 5,784,022 to Kupfer (hereafter Kupfer); claim 4 has been finally rejected under 35 U.S.C. §103(a) as being unpatentable over Kupfer in view of U.S. Patent No. 5,270,724 to Ajioka (hereafter Ajioka); and claim 5 has been finally rejected under 35 U.S.C. §103(a) as being unpatentable over Kupfer in view of Ajioka and further in view of U.S. Patent No. 5,166,690 to Carlson et al. (hereafter Carlson).

VII. GROUPING OF CLAIMS

The only independent claim is claim 1, and the patentability of dependent claims 2 and 4-8 raises or falls with the patentability of independent claim 1.

VIII. APPELLANTS' ARGUMENTS

A. The Claimed Invention

The claimed invention relates to a phase difference type of direction finding system having antenna arrays 1, 2 which are illustrated in Fig. 3 of the present application. For the convenience of the reader, an annotated copy of Fig. 3 is reproduced below:

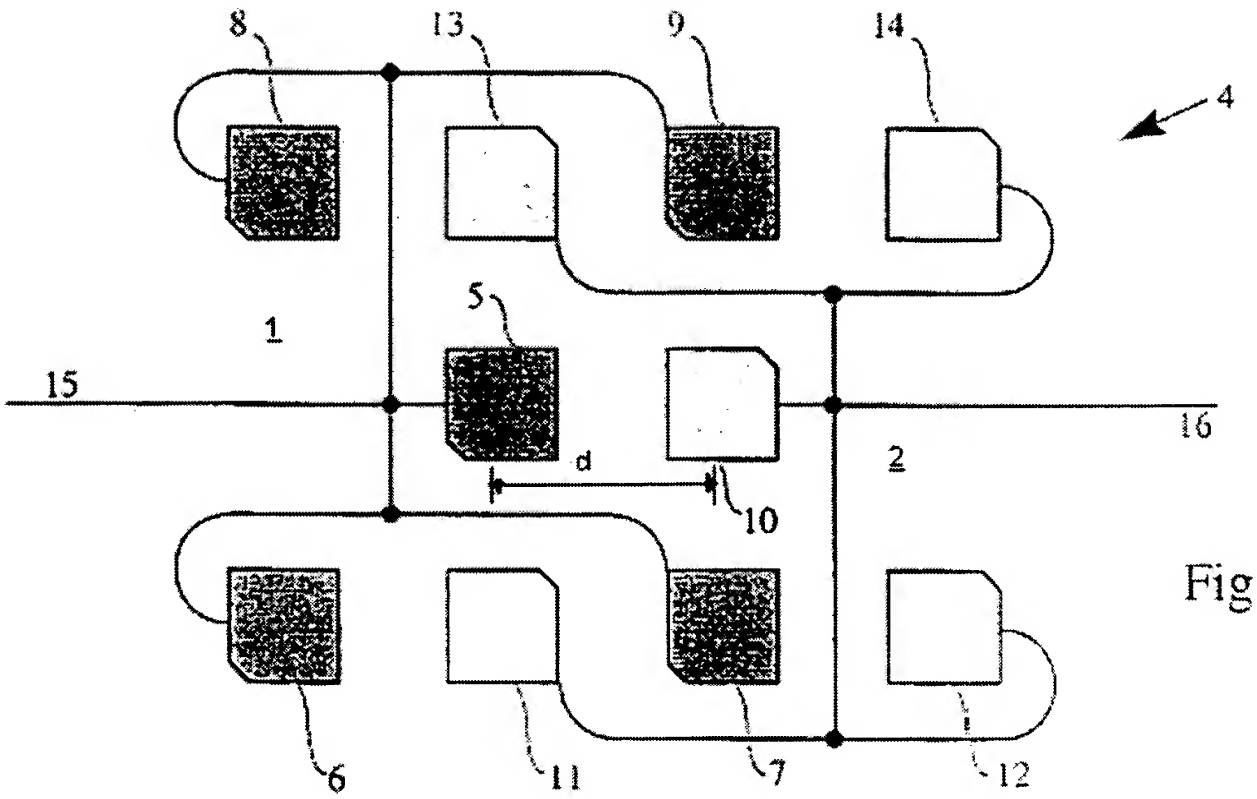


Fig. 3

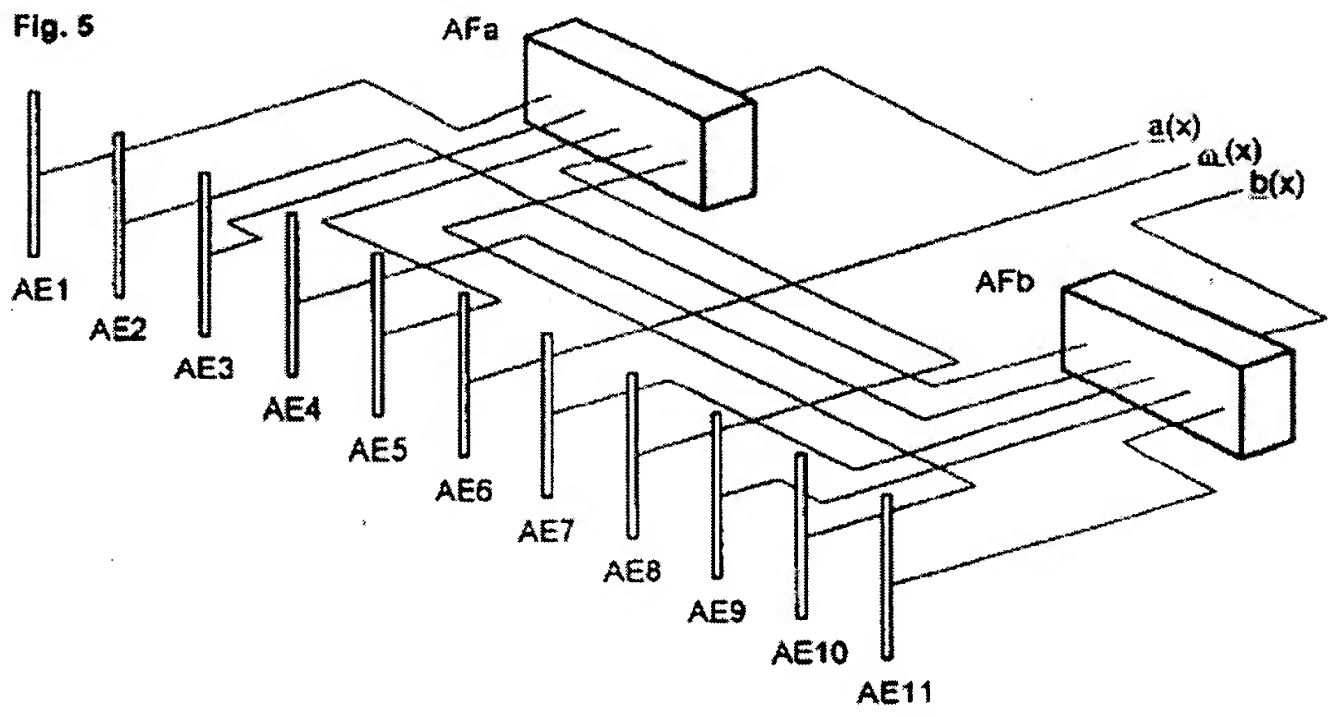
The colored antenna elements 5-9 comprise array antenna 1.
The uncolored antenna elements 10-14 comprise array antenna 2.
The distance "d" is the distance between antenna elements 5 and 10.

It can be appreciated from Fig. 3, that each of the array antennas 1, 2 has an antenna element located at its center. The phase center of array antenna 1 includes antenna element 5, and the phase center of array antenna 2 includes antenna element 10. There is a distance “d” between the phase centers or antenna elements 5 and 10, and this distance is smaller than half the width of an individual array antenna. Since the different phase centers of the respective array antennas are placed at least a close distance to each other, there is always a non-zero distance between the phase centers.

B. The Cited Prior Art - U.S. Patent 5,784,022 (Kupfer)

The Kupfer patent discloses a process for use with an amplitude or phase monopulse radar device for position measurement of a first target (TT1) and a second target (TT2). The targets are detected by a radar beam from the directions x1, y1; x2, y2, whose echo signals overlap. (See Kupfer Fig. 1). The system includes a horn or array antenna, which for one measurement axis x, has at least three subantennas (A, B, Ω). The subantennas provide output signals that are used to determine the direction to the targets. The Examiner has finally rejected claims 1, 2 and 6-8 under 35 U.S.C. §102(a) as being anticipated by the subantennas (A, B, Ω) of Fig. 5 of the Kupfer patent. (See Final Rejection, page 2, dated May 18, 2004) For the convenience of the reader, Fig. 5 of the Kupfer patent is reproduced below.

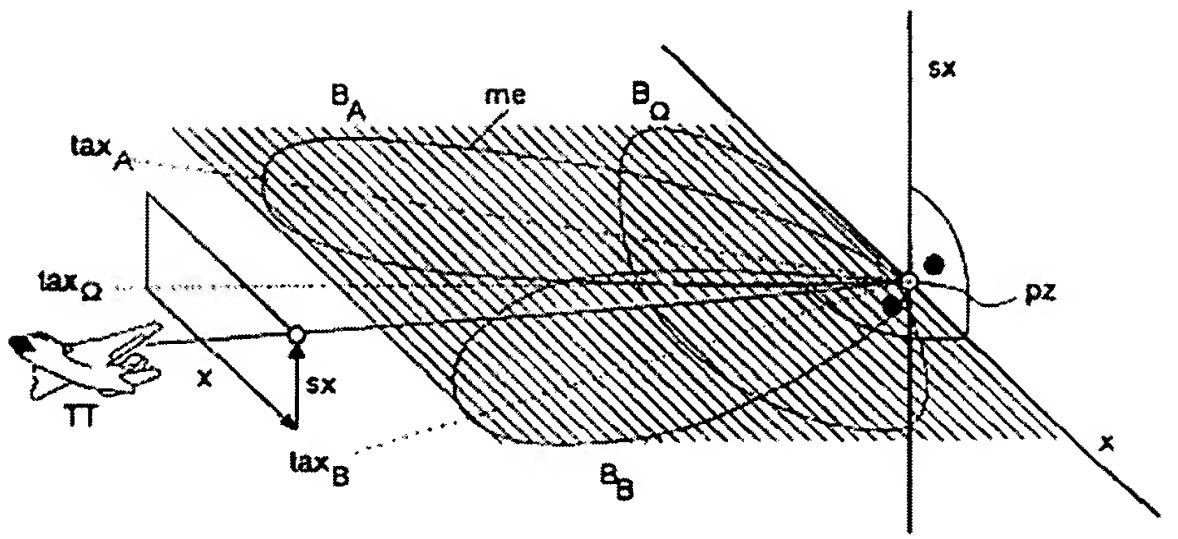
Fig. 5



Kupfer clearly states, "Fig. 5 shows an array with three subantennas for the ***amplitude monopulse process***". [Emphasis added], [See column 4, lines 3-4]. Moreover, Kupfer teaches that, "In the extended ***amplitude monopulse process***, the subantennas A, B, and Ω should receive the beams within the measurement plane in different directions (squint beams, which have an angle difference only within the measurement plane), and ***should have a common phase center*** or an identical phase response." [Emphasis added], [See column 5, lines 6-11]. It is clear that the Kupfer patent teaches that the amplitude monopulse process of Fig. 5 should have antennas with a common phase center.

Fig. 6 of Kupfer also clearly indicates that the squinted subantennas of Fig. 5 share a ***common phase center*** pz, and that the phase centers are not placed at a close distance to each other, as claimed in independent claim 1. Kupfer states, "Fig. 6 shows the antenna beams of the antennas shown in Figs. 2 and 5." [See column 4, lines 5-6]. For the convenience of the reader, Fig. 6 is reproduced below:

Fig. 6



It is respectfully submitted that antenna arrays of Fig. 5, having the squinted antenna beams of Fig. 6, share a **common phase center pz**, and that *the different phase centers are not placed at least a close distance to each other* as required by independent claim 1. *The teachings of Figs. 5 and 6 are contrary to the claimed invention of independent claim 1 which includes antenna arrays having different phase centers that are placed at least a close distance* ***d*** *to each other.* The phase centers of claim 1 are not disposed at a common phase center as taught by the Kupfer patent.

C. The Distinction Between Amplitude And Phase Monopulse Sensing

The Examiner has apparently taken the position that there is no distinction between the antennas patterns used for amplitude sensing and phase sensing and that antennas are interchangeable. The Applicant respectfully disagrees and wants to point out the distinction, as described in the book entitled "Microwave Passive Direction Finding", by Stephen E. Lipsky, John Wiley & Sons, 1987. On page 27, Lipsky teaches:

> The distinction between amplitude and phase monopulse sensing can be stated as follows: In amplitude monopulse systems, the ratio signal is the result of comparing the amplitude of the two signals from two displaced antenna patterns that essentially originate from a ***single phase center*** and overlap (have some part of the received signal in common) in the far field; in phase monopulse the ratio is formed by comparing the time difference of arrival of two patterns originating from a linearly ***displaced phase center*** that overlay (are superimposed) in the far field. In amplitude monopulse systems, the amount of pattern displacement gives angular articulation. In phase monopulse, the difference in time of arrival contains the angle information. In either system, both beams receive the signal. [emphasis in the original].

Lipsky clearly teaches that there is a distinction between the antennas of the two types of systems, and Lipsky further illustrates the distinction with the following two illustrations:

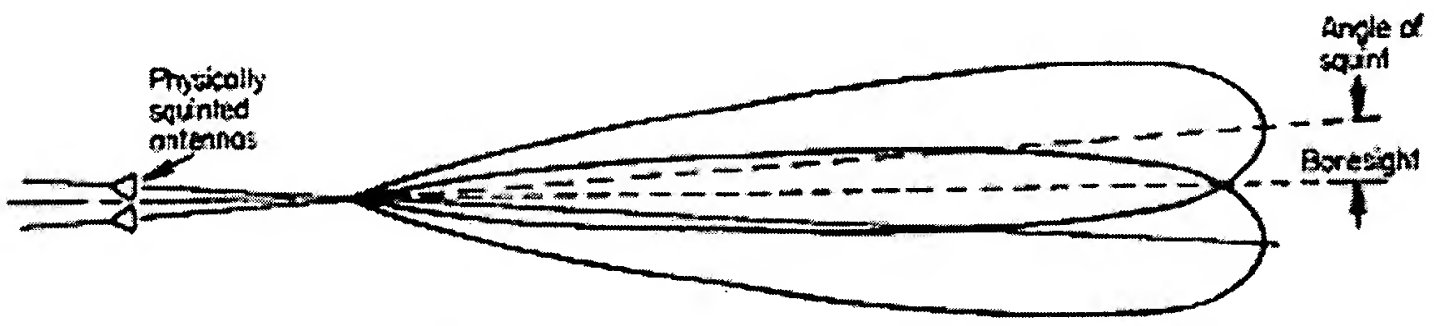


Figure 2-9. Amplitude monopulse response of two physically squinted antennas.

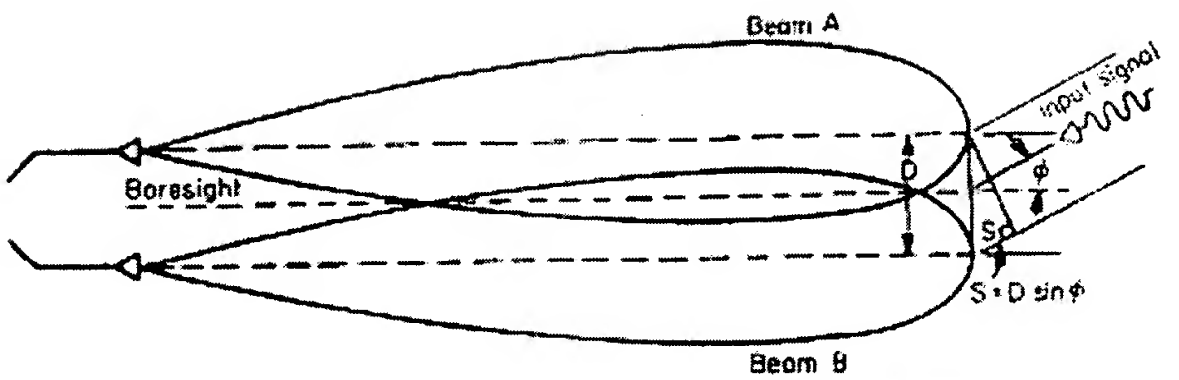


Figure 2-10. Phase monopulse response due to time difference of arrival of signal in two parallel beam antennas.

From Lipsky's Fig. 2-9, it can be readily appreciated that Kupfer's system illustrated in Figs. 5 and 6 is an amplitude sensing system having antenna patterns which are squinted from the boresight. The Kupfer antenna of Fig. 5, cited against claims 1-2 and 6-8, is not intended for use in an a phase sensing system of the type illustrated in Lipsky's Fig. 2-10 having parallel beam antennas with beam patterns that are aligned parallel to the boresight.

The Kupfer patent discloses a phase sensing embodiment in Figs. 7 and 8, and Fig. 8 shows three linearly displaced phase centers pz_D, pz_Ω, pz_C. The antenna PA1 of Fig. 7 is identified as an extended phase monopulse antenna. There is, however, no showing, teaching or suggestion in Kupfer that the amplitude sensing antennas of Fig. 5 can be used in the phase sensing embodiment of Figs. 7 and 8.

D. Kupfer's Fig. 5 Does Not Anticipate Claims 1-2 and 6-8

1. Fig. 5 of Kupfer Does Not Disclose Separated Phase Centers

It is respectfully submitted that the antennas of Fig. 5 cannot anticipate Applicant's claims 1-2 and 6-8, because there is no distance between the phase centers of the antennas of Fig. 5, and because the antennas of Fig. 5 are not intended for use in phase sensing systems of the type being claimed by the Applicant.

A patent claim is unpatentable under the provisions of 35 U.S.C. §102 if it is anticipated by a prior art reference. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference."[1] Claim 1 is not anticipated because the Examiner has not shown there is a distance between the phase centers of the antennas of Fig. 5, and because the Examiner has not shown that the antennas of Fig. 5 are intended for use in phase sensing systems of the type being claimed.

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[1] *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A reference may anticipate when the claim limitation not expressly found in the reference is nonetheless inherent in it. Inherency may not be shown by mere probabilities or possibilities. "Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates."[2] A reference may anticipate even though one of ordinary skill in the art may not have recognized "the inherent characteristics or functioning of the prior art."[3] The Examiner, however, has not shown that the missing features of claim 1 are inherently present in the Kupfer's Fig. 5.[4]

The Examiner has alleged that Fig. 5 of Kupfer discloses a system having ". . . antennas elements of the array antennas are connected to one another such that the distance between the phase centers is smaller than half the width of an individual array antenna." (See Final Rejection, page 2, May 18, 2004). The Applicant respectfully submits that Fig. 5 of Kupfer discloses an antenna array for use in an ***amplitude*** monopulse process, and that Kupfer does not disclose antenna arrays having different ***phase centers*** that are placed at least a relatively close distance to each other that is smaller than the width of an individual array. In the Advisory Action dated October 4, 2004, the Examiner has interpreted the expression "at least a close distance to each other" to mean as almost no distance, and the Examiner has taken the position that this

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[2] *Mehl/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999).

[3] *Id.*

limitation, therefore, reads on Kupfer. Although the Examiner is entitled to give a claim its broadest reasonable interpretation, the Examiner's proffered interpretation is unreasonable, because it would result in an inoperative device. In the phase sensing system of claim 1, there must be a distance d between the phase centers for the phase sensing system to operate. Without such a distance d, the device would be inoperative. Claim 1 includes a distance "d" between the phase centers that is not explicitly or inherently disclosed in Fig. 5 of Kupfer.

Accordingly, since the embodiment disclosed in Kupfer's Fig. 5 does not show phase sensing antennas which are separated by a non-zero distance, Kupfer cannot anticipate claims 1-2 and 6-8, and the Board is respectfully requested to overturn the rejection of claims 1-2 and 6-8 under 35 U.S.C. §102(a).

2. Kupfer Does Not Relate To Roadways

The preamble of claim 1 also provides an additional basis why Kupfer does not anticipate claims 1, 2 and 6-8. The preamble of claim 1 recites a device for determining a position of a vehicle on a relatively narrow ***roadway*** by using radio waves which are emitted from the device and reflected by the vehicle and received by at least two array antennas arranged across the roadway. The problem solved by the present invention is to reduce the distance between the phase centers of two or more array antennas arranged across the relatively narrow roadway.

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4 As mentioned above, the Kupfer patent disclose a phase sensing embodiment in Figs. 7 and 8, but there is no showing, teaching or suggestion that the antennas of Fig.

In contrast with the present invention, Kupfer relates to a flying object being precisely located and measured with regard to its position over a relatively wide area. (see Kupfer, col. 3, lines 27-33). The Kupfer disclosure also enables the device to distinguish between two flying objects dispersed over an even wider area (see Kupfer, col. 1, lines 8, 37, 41-43 and col. 2, lines 26-31). The present invention of claim 1, therefore, lies within a totally different technology field to that of Kupfer, and there is a substantial difference in the areas and distances in which the vehicles are moving.

The Examiner has given absolutely no weight to the "roadway" limitation in the preamble. The preamble to a claim "limits the invention if it recites essential structure or steps or if it is 'necessary to give life, meaning and vitality' to the claim.[5] But, "a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.'"[6] The Applicant respectfully submits that "roadway" limitation of the preamble is necessary to give, life meaning and vitality to the claim, and the Examiner incorrectly failed to give it weight. Accordingly, since there is no teaching that the antennas of Kupfer's Fig. 5 can be used to determine the position of a vehicle on a roadway, Kupfer cannot anticipate claim 1.

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5 can be used in the phase sensing embodiment.
[5]*Catalina Marketing Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (internal citation omitted).
[6]*Id.* (internal citation omitted).

E. Dependent Claims 4 and 5

Applicant believes that dependent claims 4 and 5 are allowable for at least the same reasons as independent claim 1 from which they depend. Accordingly, the Board is respectfully requested to overturn the rejection of claims 4 and 5 under 35 U.S.C. §103(a).

IX. CONCLUSION

The required Appeal Brief Fee in the amount of $500 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____
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1807-0151P

Attachment: Appendix - Claims Appealed

CLAIMS APPEALED

1. A device for determining a position of a vehicle on a roadway by using radio waves which are emitted from the device and reflected by the vehicle and received by at least two array antennas arranged across the roadway, comprising:

each of the array antennas including a number of antenna elements, one of the antenna elements in the respective array antenna constituting a phase center of the array antennas, and

wherein the antenna elements of the array antennas are connected to one another such that a distance between the phase centers of the array antennas included is smaller than half the width of an individual array antenna, and

wherein the different phase centers of the respective array antennas are placed at least a close distance to each other.

2. The device according to claim 1, wherein the connection comprises interweaving the array antennas with each other in that the phase center of one array antenna is arranged among the antenna elements of another array antenna.

3. **(Canceled)**

4. The device according to claim 2, wherein some of the antenna elements are at the same time connected to more than one array antenna .

5. The device according to claim 4, wherein signals obtained from antenna elements which are utilized by more than one array antenna undergo a power amplification, followed by a power division of the amplified signal on the respective array antenna .

6. The device according to any of the preceding claims, wherein an azimuth angle θ to the vehicle is determined from an antenna position where at least one pair of substantially horizontally arranged array antennas is arranged.

7. The device according to claim 6, wherein an angle of elevation to the vehicle is determined from the antenna position where at least one pair of substantially vertically arranged array antennas is arranged.

8. The device according to claim 7, wherein the position of the vehicle in relation to the antennas is determined by means of knowledge of the azimuth angle θ and the angle of elevation.